

1. 1. The first
 2. 2. The second
 3. 3. The third
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 7. 7. The seventh
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 10. 10. The tenth
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 89. 89. The eighty-ninth
 90. 90. The ninetieth
 91. 91. The ninety-first
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 93. 93. The ninety-third
 94. 94. The ninety-fourth
 95. 95. The ninety-fifth
 96. 96. The ninety-sixth
 97. 97. The ninety-seventh
 98. 98. The ninety-eighth
 99. 99. The ninety-ninth
 100. 100. The hundredth

2 a substrate; and

1 2. The semiconductor film of claim 1, wherein the graded gallium nitride layer is
2 deposited using metalorganic chemical vapor deposition (MOCVD).

1 3. The semiconductor film of claim 1, wherein the graded gallium nitride layer
2 has a net compressive stress.

2 4. The semiconductor film of claim 1, wherein the graded gallium nitride layer is
3 deposited by changing a vapor pressure of the supply of at least one precursor in a growth
chamber for the graded gallium nitride layer.

1 5. The semiconductor film of claim 1, wherein the precursor is gallium,
2 aluminum or nitrogen.

1 6. The semiconductor film of claim 1, wherein the graded gallium nitride layer is
2 deposited by changing a parameter of the growth chamber for the graded gallium nitride
3 layer.

1 7. The semiconductor film of claim 6, wherein the parameter of the growth
2 chamber is a total pressure, a temperature of the substrate, a total flow, a rate of substrate
3 rotation or a reactor wall temperature.

1 8. The semiconductor film of claim 1, wherein the graded gallium nitride layer is
2 deposited by changing the geometry of the growth chamber for the graded gallium nitride
3 layer.

1 18. A method of producing a semiconductor film, comprising:
2 providing a substrate; and
3 depositing a graded gallium nitride layer on the substrate having a varying
4 composition of a substantially continuous grade from an initial composition to a final
5 composition formed from a supply of at least one precursor in a growth chamber without any
6 interruption in the supply.

1 19. The method of claim 18, wherein the step of depositing the graded gallium
2 nitride layer comprises using metalorganic chemical vapor deposition (MOCVD).

1 20. The method of claim 18, wherein the step of depositing the graded gallium
2 nitride layer produces a graded gallium nitride layer having a net compressive stress.

1 21. The method of claim 18, wherein the step of depositing the graded gallium
2 nitride layer comprises changing a vapor pressure of the supply of at least one precursor in a
3 growth chamber for the graded gallium nitride layer.

1 22. The method of claim 18, wherein the precursor is gallium, aluminum or
2 nitrogen.

1 23. The method of claim 18, wherein the step of depositing the graded gallium
2 nitride layer comprises changing a parameter of the growth chamber for the graded gallium
3 nitride layer.

1 24. The method of claim 23, wherein the parameter of the growth chamber is a
2 total pressure, a temperature of the substrate, a total flow, a rate of substrate rotation or a
3 reactor wall temperature.

1 25. The method of claim 18, wherein the step of depositing the graded gallium
2 nitride layer comprises changing the geometry of the growth chamber for the graded gallium
3 nitride layer.

1 26. The method of claim 25, wherein changing the geometry of the growth
2 chamber comprises moving the substrate relative to injectors of the growth chamber.

1 27. The method of claim 18, wherein the substrate is silicon or silicon carbide.

1 28. The method of claim 18, wherein the initial composition is a high aluminum
2 composition.

1 29. The method of claim 18, wherein the initial composition is aluminum nitride
2 or a high aluminum content aluminum gallium nitride.

1 30. The method of claim 18, wherein the final composition is a low aluminum
2 composition.

1 31. The method of claim 18, wherein the final composition is gallium nitride or a
2 low aluminum content aluminum gallium nitride.

1 32. The method of claim 18, further comprising depositing at least one additional
2 layer on the graded gallium nitride layer.

1 33. The method of claim 18, wherein the step of forming the graded gallium
2 nitride layer comprises introducing at least one other element into the growth chamber for the
3 graded gallium nitride layer causing no abrupt variations in the varying composition of the
4 graded gallium nitride layer.

1 34. The method of claim 33, wherein the other element is silicon, indium or
2 arsenic.

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